United States Patent [19]

Sukenik

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[54] **ROLL AND METHOD OF MANUFACTURE**

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[21] Appl. No.: **393,728**

Related U.S. Application Data

[62] Division of Ser. No. 304,610, Nov. 8, 1972, Pat. No. 3,807,013.

[52] **U.S. Cl.** **29/132**, 29/129.5, 29/130

[51] **Int. Cl.** **B21b 31/08**

[58] **Field of Search** ..... 29/132, 129.5, 130, 131, 29/81 F, 81 J, 81 H, 81 L

[56] **References Cited**

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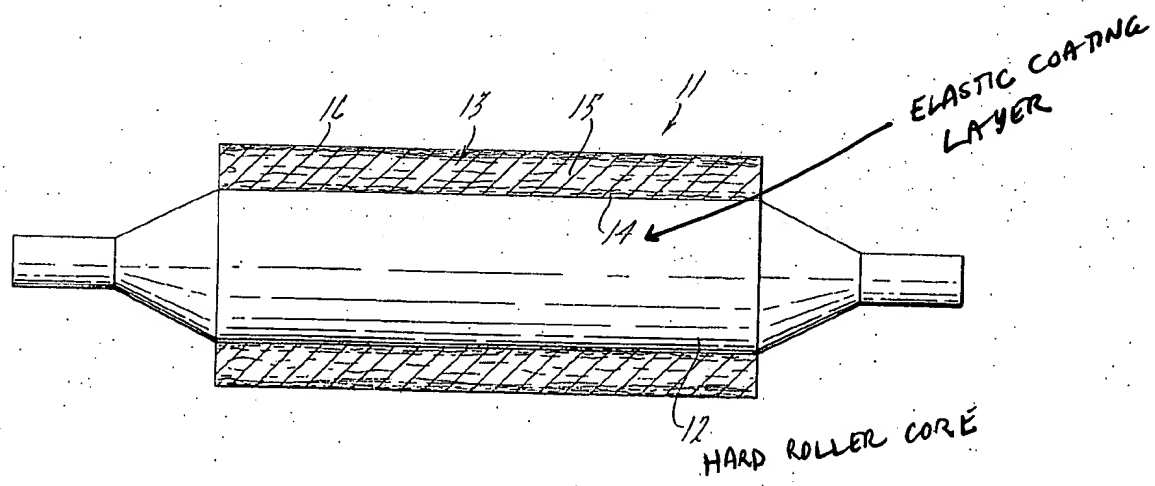
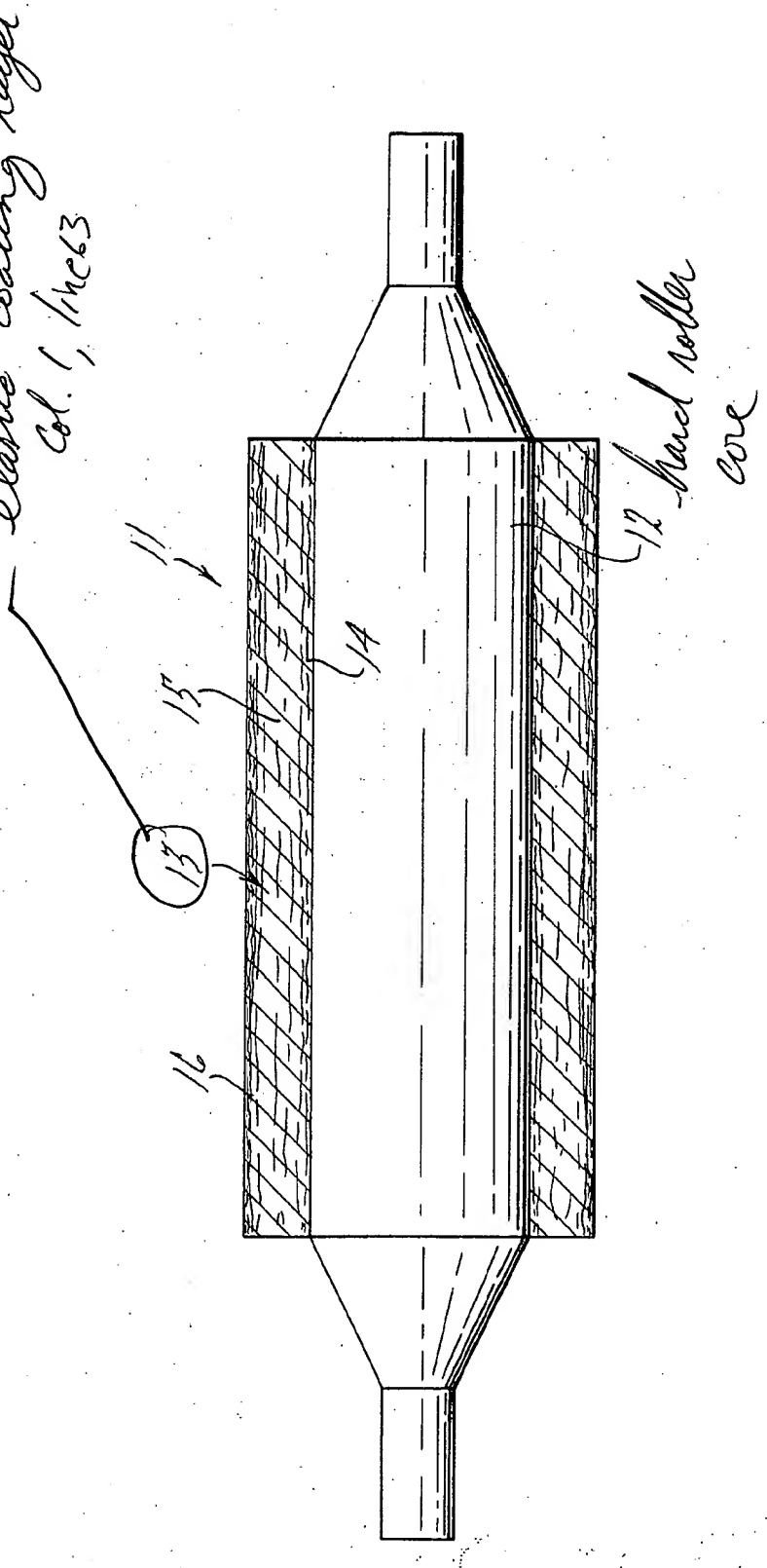
Attorney, Agent, or Firm—Harness, Dickey & Pierce

[57] **ABSTRACT**

A roll cover is made by preparing a slurry of fibers and radially depositing these fibers on a cylindrical member such as a screen, building up a sleeve which may be mounted on a mandrel. The concentration of fibers in the slurry may be tailored to suit requirements, so that a sleeve may be formed with fiber concentrations which vary in a radial direction.

2 Claims, 1 Drawing Figure




elastic coating layer
Col. 1, line 63
11
12 hard roller core
13
13'
14
16

ROLL AND METHOD OF MANUFACTURE

This a division, of application Ser. No. 304,610, filed Nov. 8, 1972 now U.S. Pat. No. 3,807,013, issued Apr. 30, 1974.

BACKGROUND OF THE INVENTION

1.Field of the Invention

The invention relates to rolls used to carry products such as glass, aluminum, brass, copper and steel through lehrs, furnaces or ovens. Such products may be subject to marking while passing over the rolls if the latter are improperly designed.

2.Description of the Prior Art

Glass lehr and furnace roll designs for this function have utilized asbestos discs compressed axially under high forces and then machined on their outer diameter. Due to the hazards which attend the use of asbestos, it is desirable to develop alternate constructions.

BRIEF SUMMARY OF THE INVENTION

It is the general object of the invention to provide a novel and improved roll for carrying markable products through lehrs, furnaces or ovens, and a method of manufacturing such a roll which permits the use of materials other than asbestos.

It is another object to provide an improved method of this nature which permits various rolls to be made with properties best suited for their particular applications.

Briefly, the construction of this invention comprises a cylindrical body and a sleeve of pressure formed fibrous material The sleeve may be formed of ceramic fiber or mixtures of ceramic and metallic wool materials. One method of this invention comprises making a slurry of fibers containing various inorganic or organic binders, placing a cylindrical screen in the slurry and creating a vacuum within the screen so that the fibers in the slurry are deposited thereon and interlace themselves to build up to any desired thickness. The tubular section so manufactured can be mounted on the roll body without any significant axial compression to accomplish an equivalent or improved result as compared with asbestos covered rolls. The fiber concentration in the slurry may be varied during the course of deposition to create sleeves with various fiber densities or with densities which vary in a radial direction.

BRIEF DESCRIPTION OF THE DRAWINGS

The FIGURE shows a roll carrying a vacuum deposited sleeve made according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The roll is generally indicated at 11 and comprises a body 12 of cylindrical shape which may be of steel, stainless steel or other suitable material. Mounted on this body is a sleeve generally indicated at 13. The material of this sleeve may be ceramic fibers such as "Kaowool" manufactured by Babcock & Wilcox Company, "Fiberfrax" manufactured by Carborundum Company, quartz, amorphous silica, mineral wool, glass, or metallic wools. Alternatively, these fibers may be mixed with metallic wool for strength and resiliency. Sleeve 13 may be secured to body 12 by any suitable means such as a bonding adhesive, pins, keys, collars or set screws. Sleeve 13 may be made up of axially adjacent sections instead of as one continuous member.

One method of manufacture of sleeve 13 is as follows: A slurry is prepared of fibers and various inorganic or organic binders. A cylindrical screen having an outside diameter approximating the diameter of body 12 is placed in this slurry of fibers. A vacuum is created inside the screen so that the fibers are deposited on the screen and interlace themselves, being built up to any desired thickness. After the proper thickness is attained, the screen is removed from the slurry and the sleeve allowed to dry. Alternately, the fibrous tubular section can be removed while wet and allowed to dry on another mandrel or the roll mandrel. The outside surface of the sleeve may be machined if desired, or could be mounted on the body without subsequent machining. The latter construction would minimize marking and make less critical any out-of-round condition of the parts.

If desired, the slurry concentration could be tailored to create concentric discrete zones of varying fiber concentration. For example, zone 14 adjacent body 12 could have a fiber mix which has superior resiliency to take up radial expansion of body 12 when it is subjected to heat during operation. Intermediate zone 15 could have a fiber mix with the desired insulating value and nominal strength. The fiber mix of outer zone 16 could provide strength, insulative qualities and abrasion and scratching resistance. The sleeve may alternately be formed by other methods of radial deposition of the slurry fibers. For example, instead of creating a vacuum inside the screen, pressure could be applied to the slurry, so that the pressure differential causes deposition. The fibrous material could be propelled against the screen with sufficient velocity to accomplish interlacing and bonding, for example by air deposition or "gunning". The slurry could, in other words, comprise a gaseous fluid.

After the sleeve has been formed by any of the above methods, it could be subjected to a subsequent wet rolling operation to provide densification and concentricity.

Another alternative method is to form the fibrous sleeve on the inside of a tubular screen to provide maximum density to the outer fibers.

In some cases, the cylindrical screen could be left in place as a reinforcing element when the sleeve is mounted on the roll mandrel.

I claim:

1. A roll for carrying a markable product through a lehr, furnace or oven comprising a relatively rigid cylindrical body and a seamless sleeve on said body and secured thereto, all portions of said sleeve between its inner and outer surfaces being fabricated solely of fibrous material selected from the group containing "Kaowool," "Fiberfrax," amorphous silica, mineral wool, glass, quartz and metallic wool, and a binder, the concentration of fibers in said sleeve varying in a radial direction, whereby concentric zones of varying resiliency and strength are created, said zones being radially continuous and uninterrupted between said inner and outer surfaces.

2. The combination according to claim 1, the sleeve having an inner zone with a fiber mix which imparts relatively high resiliency, an intermediate zone with a fiber mix having substantial insulative properties, and an outer zone with a fiber mix imparting substantial abrasion-resistant qualities.

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